



REMARKS

The Office Action dated September 21, 2006, has been received and carefully noted. The following remarks are submitted as a full and complete response thereto.

Applicant respectfully objects to the USPTO's continued failure to update the correspondence address for the present application. A revocation and new power of attorney were filed almost five years ago, on April 8, 2002. The failure by the USPTO to update the correspondence address for the present application inevitably results in delay in the prosecution of this application, which is unfair to the Applicant and to the Assignee, Broadcom Corporation. Applicant respectfully requests that the USPTO updates its correspondence address at the earliest possible opportunity. Additionally, Applicant respectfully requests that – in the event the correspondence address has not been changed – the USPTO provide a courtesy facsimile of any correspondence responsive to this submission to the number shown below the signature block, so as to minimize the delay associated with the USPTO's failure to update the correspondence address.

Claims 1-37 and 39-70 are currently pending in the application, of which claims 1, 30, 36, 39, and 68 are independent claims. Claims 36-37 were allowed. Claims 1-35 and 39-70 are respectfully submitted for consideration.

Claims 36-37 were allowed, and claims 18-29, 31-35, 56-67, and 69-70 were indicated as containing allowable subject matter. Applicant thanks the Examiner for this indication of allowance and allowability. Claims 18-29, 31-35, 56-67, and 69-70 were

objected to as being dependent on rejected base claims. Applicant respectfully submits that the base claims should be allowed, as explained below, and therefore respectfully requests that this rejection be withdrawn.

REJECTIONS UNDER 35 U.S.C. § 103(a):

In the Office Action, at page 4, claims 1-17, 30, 37, 39-55, and 68 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U. S. Patent No. 6,831,893 of Ben Nun et al. (“Ben Nun”) in view of U.S. Patent No. 6,628,617 of Karol et al. (“Karol”). The Office Action took the position that Ben Nun describes all the recitations of independent claims 1, 30, 36, 39, and 68 and related dependent claims, except those “involving limitations of ‘separate flow, forwarding and translation databases to perform the above flow control functions.’” Applicant respectfully traverses this rejection and requests reconsideration and allowance.

Independent claim 1, upon which claims 2-29 are dependent, recites a method for balancing transmission unit traffic over network links. The method includes disposing transmission units into flows, grouping flows into first flow lists, each of the first flow lists corresponding to a selected network link, and determining a traffic metric representative of a traffic load on the selected network link. The method further includes responsive to the traffic metric, regrouping flows into second flow lists corresponding to the selected network link, the regrouping balancing the transmission unit traffic among

the network links, and transmitting the respective second flow list over the respective selected network link.

Independent claim 30, upon which claims 31-35 are dependent, recites a method for balancing transmission unit traffic over heterogeneous speed network links. The method includes disposing transmission units into flows, wherein each of the transmission units includes one of source information, destination information, and a combination thereof, and the disposing comprises characterizing each of the transmission units according to one of the source information, the destination information, and a combination thereof. Each of the transmission units comprises one of a packet, a frame, a cell, and a combination thereof. The method also includes grouping flows into first flow lists, each of the first decreasing-size-ordered linked flow lists corresponding to a selected network link; determining a traffic metric representative of a traffic load on the selected network link; responsive to the traffic metric, regrouping flows into second decreasing-size-ordered linked flow lists corresponding to the selected network link, the regrouping balancing the transmission unit traffic among the network links; and transmitting the respective second flow list over the respective selected network link using a predetermined link-layer transmission protocol, wherein the predetermined link-layer transmission protocol communicates the transmission unit traffic over the network links in cooperation with a network-layer protocol. The network-layer protocol cooperates with a transport-layer protocol to communicate the transmission unit traffic across the network links, and wherein each of the network-layer protocol and the

transport-layer protocol is one of a connectionless protocol and a connection-based protocol.

Independent claim 39, upon which claims 40-67 are dependent, recites a computer program product recorded on a computer readable medium for balancing transmission unit traffic over network links, including computer readable program code which disposes transmission units into flows, computer readable program code which groups flows into first flow lists, each of the first flow lists corresponding to a selected network link, computer readable program code which determines a traffic metric representative of a traffic load on the selected network link. A computer readable program code is included which, responsive to the traffic metric, re-assigns flows into second flow lists corresponding to the selected network link, the re-assigning balancing the transmission unit traffic among the network links. A computer readable program code is included which transmits the respective second flow list over the respective selected network link.

Independent claim 68, upon which claims 69-70 are dependent, recites a network load balancer in a communication network having network links. The network load balancer includes a flow synthesizer that receives transmission units from a transmission unit source, and synthesizes flows characteristic of selected transmission units, and a link classifier, coupled with the flow synthesizer and the network links. The link classifier classifies the network links relative to a predetermined flow metric, and assigns selected flows to selected network links responsive to the predetermined flow metric, the selected

transmission units corresponding to the selected flows being communicated with the communication network through the respective selected network links.

As will be discussed below, the proposed combination of Ben Nun and Karol fails to teach or suggest all the elements of any of the presently pending claims.

Ben Nun generally relates to an apparatus and method for wire-speed classification and pre-processing of data packets in a full duplex network. Ben Nun generally describes a classifier 260 determining a flow to which a data packet belongs based on the source and destination IP addresses contained in the header HDR of the data packet. *See*, column 8, lines 11-15.

In addition to determining the flow of a data packet based on the IP addresses, the classifier 260 of Ben Nun may also determine the flow based on the source and destination port values contained in the header HDR of the data packet. *See*, column 8, lines 15-34. Furthermore, the classifier 260 can additionally identify a specific flow of the data packet based on the protocol value contained in the header HDR of the data packet. *See*, column 8, lines 34-37.

However, Ben Nun fails to teach or suggest, at least, “grouping flows into first flow lists, each of the first flow lists corresponding to a selected network link,” as recited in independent claim 1. Instead of grouping flows into first flow lists, Ben Nun arranges data packets into a particular flow based on the header information of each data packet. The classifier 260 of Ben Nun may identify a particular flow of the data packet based on

the protocol value, but does not teach or suggest that once the flows are identified, these flows are further grouped “into first flow lists” as recited in independent claim 1.

The Office Action took the position that Ben Nun discloses this feature at Figure 2, and column 8, lines 38-42. However, the cited passage simply states that each of the packet processors PP1 to PPN is designated to process packets belonging to a particular flow. For example, processor PP1 may be designated to process data packets from a first flow. The passage – and all of Ben Nun – is silent as to flow lists or grouping the flows into flow lists. Accordingly, Applicant respectfully submits that these features are neither disclosed nor suggested by Ben Nun.

The Office Action’s “Response to Arguments” section does not support the rejection. Applicant notes that the Office Action’s response is that “the reference clearly discloses [nothing].” Applicant agrees that there is no disclosure in Ben Nun that is relevant, and respectfully submits that the reason that the reason the “Response to Arguments” section is incomplete with regard to the discussion relating to this feature, is that Ben Nun does not and cannot disclose this feature.

In addition, according to Ben Nun, the classifier 260 receives information from each of the packet processors PP1 to PPN indicating the relative load on each of the packet processors PP1 to PPN. *See*, column 9, lines 28-32. Then, the classifier 260 assigns a new flow to the packet processor PP1, PP2 ... or PPN that has the smallest load.

Ben Nun, therefore, also fails to teach or suggest, at least, “responsive to the traffic metric, regrouping flows into second flow lists corresponding to the selected network

link, the regrouping balancing the transmission unit traffic among the network links,” as recited in independent claim 1. Instead, Ben Nun receives information pertaining to the processor PP1 to PPN load of data packets, not of grouped flows as in the present invention.

Ben Nun does not regroup flows into second flow lists. Rather, the classifier 260 of Ben Nun assigns a new flow to the packet processor PP1, PP2 ... or PPN that has the smallest data packet load.

According to Ben Nun, if the classifier 260 determines that the particular data packet belongs to the particular flow and determines that one of the packet processors PP1 to PPN has previously been designated as the particular flow processor, the classifier 260 determines that the particular data packet should be output to the particular data processor. *See*, column 9, lines 32-41. Ben Nun provides loading the packet processors PP1 to PPN based on the flow of a data packet. Ben Nun does not teach or suggest, at least, “regrouping flows into second flow lists,” as recited in independent claim 1. Instead, based on the load of each packet processor PP1 to PPN or header information in each data packet, the classifier 260 assigns the particular packet processor PP1 to PPN to output the flow associated with the data packet.

The Office Action cited Ben Nun’s stream of packets as corresponding to the claimed flows. It is respectfully noted that a stream of packets may correspond to a flow, as explained, for example, by Ben Nun at column 8, line 39. The Office Action then cited Ben Nun’s flow as corresponding to the flow list. This is an improper

characterization of the art. A flow cannot be a flow list. Even if a flow list contains only a single flow, the flow list and the flow itself are distinct concepts.

The Office Action's "Response to Arguments" section also does not support the rejection on this point. Applicant notes that the Office Action's response is that "the reference clearly discloses [nothing]." Applicant agrees that there is no disclosure in Ben Nun that is relevant, and respectfully submits that the reason that the reason the "Response to Arguments" section is incomplete with regard to the discussion relating to this feature, is that Ben Nun does not and cannot disclose this feature.

Additionally, the Office Action similarly misunderstood Ben Nun with respect to the assigning a new flow to a packet processor that has the smallest load, as described by Ben Nun at column 9, lines 31-35. It is respectfully noted that Ben Nun assigns the flow to a packet processor not based on (or in response to) traffic information, but based on the reported load of the PPN.

Even if assigning the flow to the PPN were in response to traffic information (not admitted), that does not correlate to the claimed "regrouping balancing the transmission unit traffic among the network links."

The Office Action's "Response to Arguments" section again does not support the rejection on this point. Applicant notes that the Office Action's response is, again, that "the reference clearly discloses [nothing]." Applicant agrees that there is no disclosure in Ben Nun that is relevant, and respectfully submits that the reason that the reason the

“Response to Arguments” section is incomplete with regard to the discussion relating to this feature, is that Ben Nun does not and cannot disclose this feature.

Certain embodiments of the claimed invention can improve flow of data in a network, by reassigning flows of packets so that they can be transmitted over various links in the network in response to traffic issues. The cited reference merely describes a network interface with multitasking ability by means a plurality of packet processors. A flow that comes into Ben Nun’s network interface directed to a link, will exit the network interface directed to the same link and without any particular relation to the traffic status of that link. In certain embodiments of the present invention, in contrast, the flow may be redirected to another link, or, for another example, may be prioritized in a decreasing size order.

Ben Nun’s Figure 2 displays a flow diagram of data within the network interface. Note that the only two physical access layers are one at the upstream side of the flow diagram, and one at the downstream flow diagram. The unlabeled bus to which PP1, PP2, and PPN are attached is not a network. It is an internal bus of a network interface. Thus PP1, PP2, and PPN are not nodes of a network. The chief way in which Ben Nun attempts to achieve some improvement in a network is by processing speed improvements. For example, Ben Nun states that “fewer processors PP1 to PPN are required to process the data packets **transmitted to the network**, and the overall operation of **the network** is enhanced.”

Thus, Ben Nun is not directed to “balancing transmission unit traffic over heterogenous speed network links” as recited in claim 30, or “balancing transmission unit traffic over network links” as recited in claims 1 and 39, nor is it a “network load balancer in a communication network having network links.” The only kind of balancing that Ben Nun performs is a kind of internal balancing amongst multiple processors in the course of processing the data. In contrast, the claims of the present invention are referring to balancing data “over heterogenous speed network links,” “over network links,” or “in a communication network having network links.”

The Office Action’s “Response to Arguments” section yet again does not support the rejection on this point. Applicant notes that the Office Action’s response is – yet again – that “the reference clearly discloses [nothing].” Applicant agrees that there is no disclosure in Ben Nun that is relevant, and respectfully submits that the reason that the reason the “Response to Arguments” section is incomplete with regard to the discussion relating to this feature, is that Ben Nun does not and cannot disclose this feature.

Karol does not remedy the deficiencies of Ben Nun, and thus the combination of Karol and Ben Nun fails to disclose or suggest all of the elements of any of the presently pending claims.

Karol is generally related to a technique for internetworking traffic on connectionless (CL) and connection-oriented (CO) networks. Karol generally describes CL-CO gateways and the accompanying hardware and software modules.

The Office Action cited Karol only for having several types of databases. Whether Karol discloses such databases is moot. Karol does not teach the features of the claim that Applicant has noted that Ben Nun does not teach. Therefore, Karol does not remedy the deficiencies of Ben Nun, and the combination of Ben Nun and Karol cannot disclose or suggest all of the elements of any of the presently pending claims.

Additionally, there is no motivation to combine Ben Nun and Karol. Karol is directed to a CL-CO gateway. Ben Nun is directed to a network interface in an implicitly CL network (note Ben Nun's header processor 250). Thus, Ben Nun could not serve as Karol's CL-CO gateway, even if databases were added to Ben Nun. Accordingly, one of ordinary skill in the art would not be motivated to combine Ben Nun and Karol.

The Office Action took the position that the motivation for the combination would have been "to maintain separate flow, forwarding, and translation databases in a gateway processor to perform the above flow control functions" and cited Karol, at column 6, lines 30-59. However, the cited passage does not suggest any such thing. Even if it did, Karol only discusses the usefulness of such a function in a gateway between a CO and a CL network. Ben Nun is not addressed to such a gateway, and thus would not have need of an invention aimed to improve such a gateway.

The Office Action's "Response to Arguments" section yet once more does not support the rejection on this point. Applicant notes that the Office Action's response is – yet once more – that "the reference clearly discloses [nothing]." Applicant agrees that there is no disclosure in Ben Nun or Karol for that matter that is relevant, and respectfully

submits that the reason that the reason the “Response to Arguments” section is incomplete with regard to the discussion relating to this feature, is that Ben Nun does not and cannot disclose this feature.

Accordingly, in view of the foregoing, it is respectfully asserted that Ben Nun and Karol do not teach or suggest all the elements of any of claims 1, 30, 39, or 68. It is, thus, respectfully requested that the rejection of claims 1, 30, 39, and 68 be withdrawn.

Claims 2-17, 37, and 40-55 depend respectively from, and further limit, claims 1, 36, and 39. Applicant respectfully submits that claims 2-17, 37, and 40-55, therefore, recite subject matter that is neither disclosed nor suggested in the cited combination of Ben Nun and Karol. It is, thus, respectfully requested that the rejection of claims 2-17, 37, and 40-55 be withdrawn.

REQUEST FOR NEW OFFICE ACTION:

In the event the above arguments are not persuasive, it is respectfully requested that the USPTO’s response take the form of a new Office Action, because the present Office Action is clearly incomplete, inasmuch as the Response to Arguments section does not respond meaningfully to Applicant’s arguments. In particular, if the arguments are not persuasive, Applicant has a right to an explanation as to why they are not persuasive.

MPEP 707.07(f) sets forth the Examiner's obligation to answer all material traversed. Specifically MPEP 707.07(f) states that “the examiner should, if he or she repeats the rejection, take note of the applicant's argument and answer the substance of

it.” It is essential that the Office Action address each of the arguments presented by Applicant, so that meaningful appellate review is possible. The Office Action, however, does not address Applicant’s arguments. Accordingly, if the rejection is again maintained, a response to the arguments is respectfully requested in a new Non-Final Office Action.


CONCLUSION:

For the reasons explained above, Applicant respectfully submits that each of claims 1-37 and 39-55 recites subject matter which is neither disclosed nor suggested in the cited prior art. Applicant therefore respectfully requests that all of claims 1-37 and 39-70 be allowed, and that this application be passed to issue.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, Applicant’s undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, Applicant respectfully petitions for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,



Peter Flanagan
Registration No. 58,178

Customer No. 32294
SQUIRE, SANDERS & DEMPSEY LLP
14TH Floor
8000 Towers Crescent Drive
Tysons Corner, Virginia 22182-2700
Telephone: 703-720-7800
Fax: 703-720-7802

PCF:jkm:kh